User Manual
EasyLine system

Version 01.11

Humidification solutions

More production advantages. Better material utilization. Satisfied employees

Airtec® A/S • Hvedemarken 21 • DK-7620 Lemvig • Phone: +45 99631300 • www.airtecsolutions.com

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EU-Declaration

EU-agreement-declaration

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Declares hereby, that:

Machine:	High-Pressure humidification system
Mark:	Airtec®
Type:	EasyLine
Machine no.:	946

Is fabricated in conformity to the technical directive 98/37/EF-2006/42/EF, 2004/108/EF, 2006/95/EF under special reference to the health and safety demands in connection with the construction and manufacturing of machines.

Title: Managing Director
Name: Bo Rahbek
Company: Airtec® A/S

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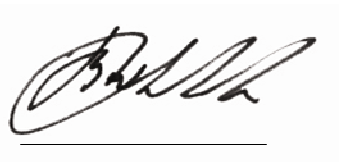


Managing Director

The right choice

Congratulations on choosing an Airtec® high-pressure humidification system. By purchasing an Airtec® EasyLine System, we guarantee that the product is produced according to the Quality– Environment and Hygiene certificates, ISO 9001, ISO 14001 and ISO 22000 HACCP.

This manual is written to ensure the correct use, performance and long life of the system and is prepared for the use of engineers and properly trained technical personnel.

Read this manual carefully before installation and before using your Airtec® humidification system.

Airtec® reserves the right to update their systems without giving prior notification.

Correct Mounting and Maintenance is Important

Follow the Airtec® Guidelines as written in this manual, and your humidification system will work to your satisfaction.

Before any work on the system starts, the system must be disconnected from the power supply and secured against re-connecting.

Installation, maintenance, repair and dismantling should only be carried out by qualified technical personnel.

In order to ensure against stagnant water and the risk of bacteria the humidifier must be left switched on continuously. If the system is shut down for any extended period of time, then the system must be disinfected, as described in the procedure within this manual.

Should there be any problems, or any doubt about the installation or operation of the humidification system, please do not hesitate to contact us for help and guidance. With maintenance on a regular basis and by following the guidelines, you can be confident of a perfect working system for years to come.

To guarantee that the system always works correctly we recommend you take out a service contract with using Airtec® authorised personnel. Our fully qualified personnel will then take care of the maintenance and servicing of the system at the correct intervals.

Delivery

When unloading and handling the products, make sure you use lifting equipment and methods, that will not cause damage to the products.

When you receive the goods please make sure that they are as agreed, and that there is no damage, transportation damage)or anything missing from the shipment.

Normally the goods will arrive wrapped and packed in protective materials. Please do not remove this protective material before installation.

Should there be any cause to complain, you must inform Airtec® immediately.
We refer to the general conditions for Airtec® A/S which you will find on the Order Confirmation.

Transportation.
During transportation the EasyLine must be kept upright. This is to avoid oil leaking from the pump.

Description of the system

Airtec® humidification systems consists of the required number of atomisers/nozzles for appropriate output together with a control unit and a high-pressure pump. The system is designed for direct air humidification in industrial applications being installed by authorised technical personnel. All systems are tested at Airtec® before delivery.

All systems use water under high-pressure to produce finely atomised sprays which rapidly evaporate to raise the humidity to the desired level. Pressure and flow control is via the control panel which also incorporates the fail safe devices Operation is fully automatic and regulated by the humidity sensor with optional temperature sensor.

The system's intended use

Airtec® humidification systems are intended for adiabatic cooling and air humidification.

Airtec® develop and manufacture air humidification systems to improve the total outcome of the productions facilities and gives people a more comfortable working environment.
Electrostatic discharge, dust, moisture shrinkage and temperature variables are the challenges to find customised solutions to solve. Airtec®'s application experience includes wood, textile and paper industry, producers of electronic equipment, tobacco, plastic, automotive, aerospace, malting, hatchery and food industry.

EU WEEE Directive

Buyers of systems from Airtec® take over the producers obligations in relation to the Environment-protection law § 9 regarding waste electrical and electronic equipment (WEEE) directive. Airtec® refer to the current law by referring the Environment-protection law: *"Environment-protection law § 9 j. Producers and importers must be responsible for the disposal and management of all waste including waste of electrical and electronic equipment which is manufactured by the producer or importer".*

Symbols

This sign is for electrical waste, and is put on the components.

This sign represents a mandatory instruction.

This sign refers to important supplementary information.

This sign indicates specific detailed actions required at installation and start-up.

This sign indicates an incorrect action.

Explanation

Permeate: Permeate is the processed, unsalted water which the RO system produces and carries further to the water tank.

Waste water: Waste water is the water which will be carried to the drain. This water contains the salts and minerals which are removed from the mains water.

Raw water: Raw water is the water required to supply the system, often delivered from waterworks or a private mains supply. The raw water must meet all local and national regulations and requirements. See page 7.

Softened water: Softened water is the raw water which is produced after treatment in the softening system.

Conditions for Installation

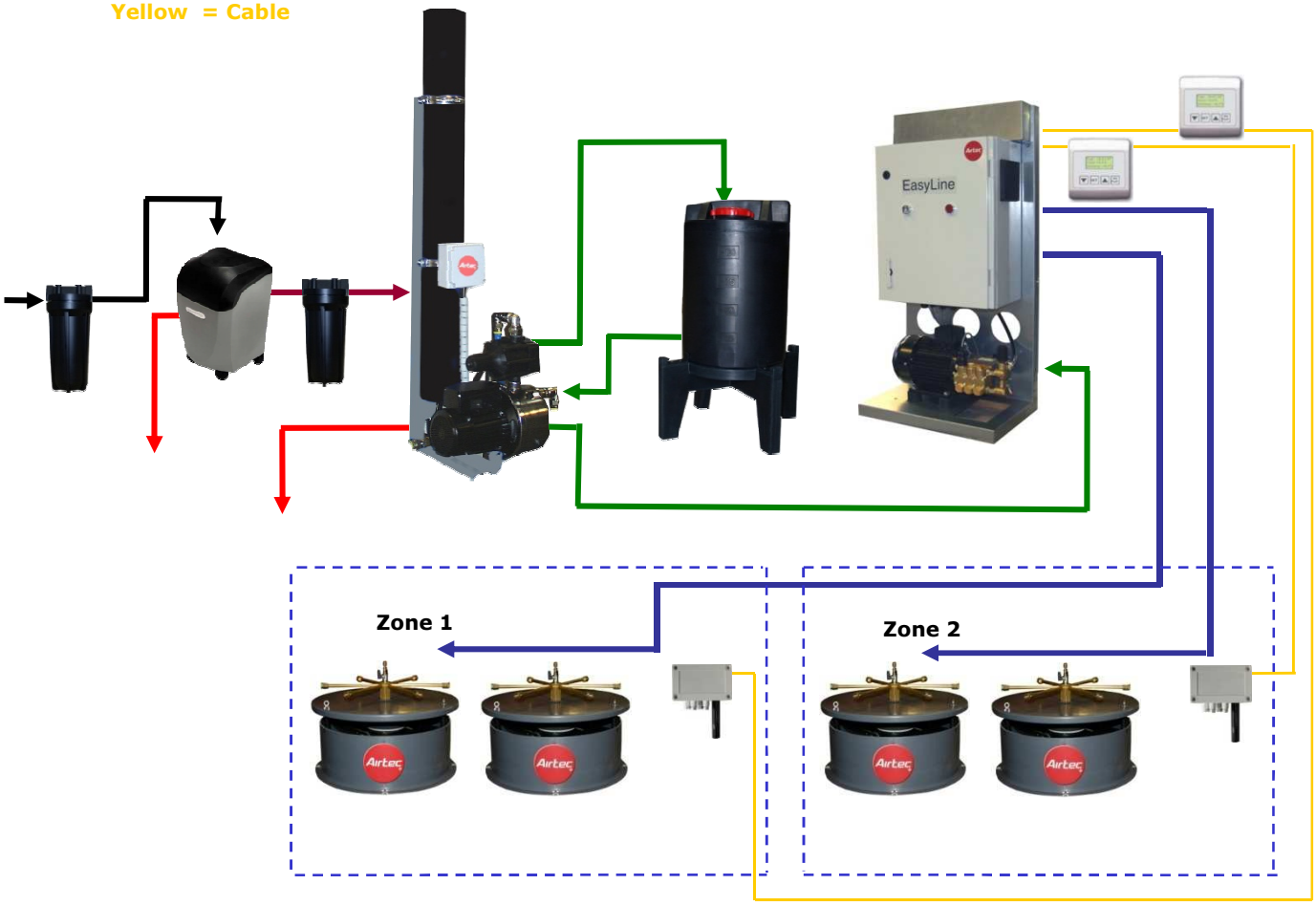
Installation place

EasyLine must only be installed in a room where there is a drain.
EasyLine measurements: H: 1020 mm - B: 530 mm - D: 360 mm.
Weight: 50 kg.

EasyLine must be installed in a non-freezing room with surrounding room temperature at max. + 35ºC.

Overview of typical system

Black = Water supply
Red = Connection to drain
Purple = Softened water
Green = RO water
Blue = Water under 50-55 bar pressure to the atomiser
Yellow = Cable



☑ A drain in the floor must be available around EasyLine.

☑ Non-freezing installation room.

☑ Surrounding room temperature for EasyLine at max. + 35ºC.

Supply requirements

Water connection

Water supply to the EasyLine system must be constructed according to local regulations. The system must only be connected to the cold mains water supply(max. + 15ºC) without the prior risk for growing up conditions for bacteria.
The water pressure must be delivered to the EasyLine pump at a minimum of 2 bar pressure and a maximum of 4 bar pressure when the Airtec® EasyLine system is running at maximum output.
If a water softening system is installed to the system the delivered water pressure to the water softening system must be at minimum of 3 bar and maximum of 7 bar, yet must the water pressure to the EasyLine pump not exceed 2 – 4 bar as previously stated.

When connecting a reverse osmosis system; please see separate User Manual.

Drain for the pressure-release venting has to be 40 mm in diameter and terminated 20 cm above floor drain.

The water supply must be protected against pollution by 2 off connected 1µm filter which are included within the delivery.

Water inlet pressure which can be seen in the display at the frequency inverter

The water pressure must, when the system is running at maximum output, give a pressure at min. pressure of 2 bar up to max. of 4 bar and must be terminated in a Ball valve with a 3/4" external thread.

☑ Ensure that the water pressure is kept constantly at min. pressure of 2 bar up to max. of 4 bar when the Airtec® EasyLine system is running at max. output.

☑ Drain for the pressure-release venting has to be 40 mm in diameter and terminated 20 cm above floor drain.

☑ The water supply must be protected against pollution by 2 off connected 1µm filter which are included within the delivery.

Supply requirements

Water quality

Water quality must comply with the existing order of drinking water, but at least equivalent to a Danish drinking water standard.

Max. water temperature + 15 ºC.

Airtec® recommend Reverse Osmosis water (RO water) for the best results.
If the hardness of the water is more than 3º dH, Airtec® recommends the installation of a Softening System.

If no water treatment is installed, Airtec® recommends that water hardness is no higher than 3ºdh.

If there is any doubt or uncertainty about the content or the quality of the mains water or the drinking water, we recommend a water analyse is carried out.

Power supply

All installations/connections must be carried out according to the existing law and regulations. Airtec® is following the existing laws and regulations for installation/connection according to the EU regulations.

Before any work on the system starts, the system must be disconnected from the power supply and secured against re-connecting.

Note: the Airtec® system include a frequency inverter. (For further details see separate manual).

EasyLine system

Power supply: 230V+PE

Fuse: 13 A

The electric installation has to be 230V+PE (13A) and is terminated close to the EasyLine in an approved supply separator.

☑ Check that the power supply has correct voltage 230V+PE.

☑ The installation is protected by a 13 A fuse.

Hose, Nozzle and Fitting

Handle hoses and other parts of the system in a way that prevents dust and other partials entering the system, otherwise it will cause problems to the spraying efficiency. Hose ends must be sealed during installation and leading..

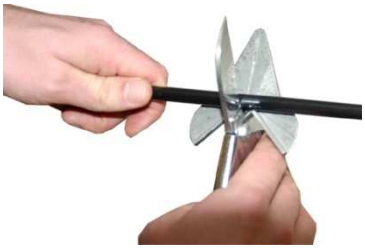
It is very important to use the right tools, -especially for cutting hoses. When cutting hoses it is important to create "straight, clean" ends, before connectors are fitted.

Wrong *tools for cutting hoses*

The Nozzles are to be tightened by hand only and must be tightened until the two metal surfaces meet each other. Do **not** use tools.

*Do **not** use tools*

Installation of hose in SlipLock fitting.
The high-pressure hose must be cut with a sharp tool/scissor to produce "straight, clean" ends.
Push the hose into the SlipLock fitting, give a small pull backwards and to ensure the hose is locked in.



Installation of SlipLock

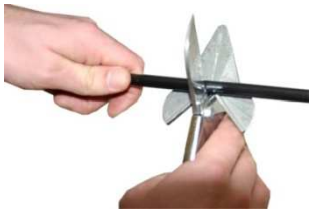
The unique SlipLock system is specially designed by Airtec® for supplying water under high pressure. The system contains of SlipLock fittings and polyamide hoses that with simple means, is fitted without special tools or extensive experience.

The SlipLock system is supplied as an assembly kit. All components have o-ring seals, this eliminates the need for special tools and guarantees it seals every time.

With a simple blind cork the system can be assembled as an elbow and used for the installation of the hoses as well.

The kit is assembled and tightened with a wrench.

- And is now ready for use.



The high pressure hose is cut with a sharp scissor.

- And the SlipLock fitting is clicked on.

The Sliplock is now ready for use.

- Fittings are produced in brass, sealed with a nickel plated surface to ensure optimised corrosion resistance.
- The hoses is produced in Polyamide 12 (PA 12-HL) Black in colour, stabilised against heat ageing, as well as being light stabilised.

Installation of Low Flow kit for high-pressure Pump Type A-600 – A-700

Low Flow kit consist of:

- Hose.
- Special adapter without nozzle.
- Special adapter with nozzle - internal.

Terminate power and water supply.

Remove both blind cork's, one at the low-pressure (water inlet) and one at the high-pressure (water outlet) in the cylinder head.

Installation of the Low Flow kit:

The special adapter without the nozzle to be installed in the thread-hole at the high-pressure side (at the top). The special adapter with nozzle (internal) to be installed in the thread-hole at the low-pressure side (bottom).

Connect the 2 special adapters with the enclosed/delivered hose.

Note; At service the function of the Low Flow kit must be checked. Eventually replacing the special 21 l/h nozzle.

Running the EasyLine system with DigiSens sensor

The following text explains the ”start up” procedure, and the basic adjustments of the system. Before the system starts running, please check all connections again, to ensure that the installation instructions have been followed.

Transportation

During transportation the EasyLine must be kept upright. This to avoid oil leaking from the pump.

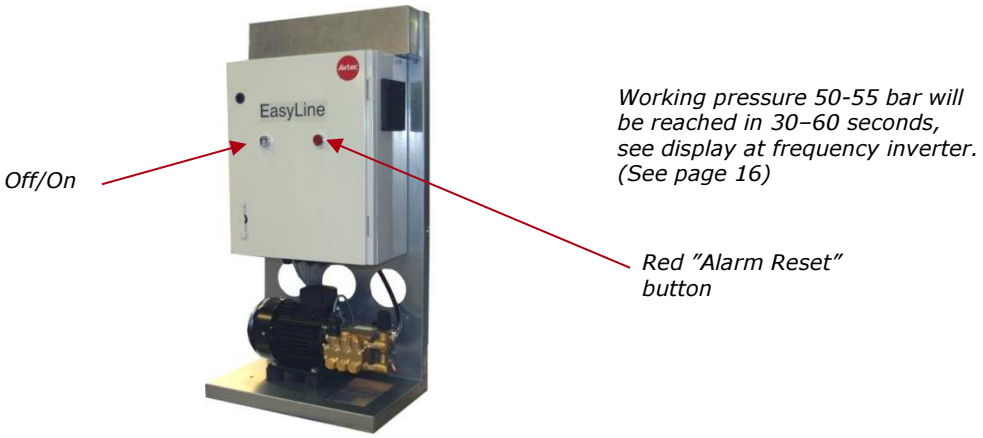
Check the nozzles

Check that nozzles are fitted in all nozzle holders/atomisers, and that these are tightened by hand.

Start up EasyLine

- ☑ Connect power –and water supply.

- ☑ Set all sensors to 0% RH. (See page 18).
- ☑ Activate fuse F1 for control circuit. (See inside EasyLine).
- ☑ Set the sensor for zone (room) 1 to 100 % RH and Temp. at 0 ºC.
- ☑ Working pressure of 50-55 bar will be reached in 30–60 seconds. (See display at frequency inverter). If the working pressure is not 50 – 55 bar the bypass must be adjusted. (See page 13).


EasyLine
Off/On
Working pressure 50-55 bar will be reached in 30–60 seconds, see display at frequency inverter. (See page 16)
Red ”Alarm Reset” button

- ☑ Check the system for leaks.
- ☑ Set the sensor to 0% RH.
- ☑ Repeat the steps above for all zones (rooms).
- ☑ When all zones are tested, insert the set point in the sensor on the required RH and Temp. value.
- ☑ The system is now running.

After installation, service or repair of the humidification system unusual running conditions may be observed due to air in the system, this can show as small drips from the nozzles when you start and stop the system. Under normal conditions this will end within 2 - 4 days of running.

Your Airtec® humidification system must always be connected to the power supply and running. This because of considerations. If there are any periods where you do not require humidification, the system must not be shut down, instead you must set the system to 0 % RH.

Running the EasyLine system with HMH sensor

The following text explains the ”start up” procedure, and the basic adjustments of the system. Before the system starts running, please check all connections again, so that the installation instructions are followed.

Transportation

During transportation the EasyLine must be kept upright. This to avoid oil leaking from the pump.

Check the nozzles

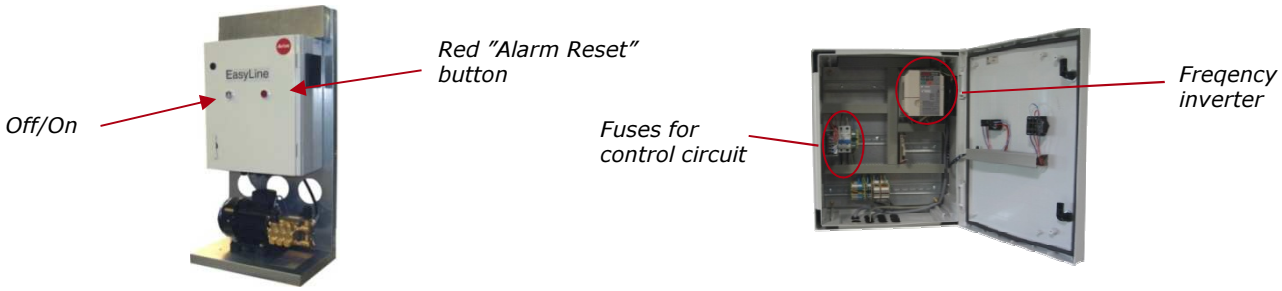
Check that nozzles are fitted in all nozzle holders/atomisers, and that these are tightened by hand.

Start up EasyLine

In the following use the controls on the front of the EasyLine and the HMH sensor.

- ☑ Connect power –and water supply.
- ☑ Set all sensors to 0% RH.

- ☑ Activate fuse F1 for control circuit. (See inside the EasyLine).
- ☑ Turn the Off/On button on the front of the EasyLine to ”On” position.
- ☑ Set the sensor for zone (room) 1 to 100% RH.
- ☑ Press and hold the red ”Alarm Reset” for minimum 5 seconds. (System starts).
- ☑ Working pressure of 50-55 bar will be reached in 30–60 seconds. (See display at frequency inverter). If the working pressure is not 50 – 55 bar the bypass must be adjusted. (See page 13).
- ☑ Check the ventilator in the atomisers, and see that these are running properly.
- ☑ If start/stop of ventilator is installed, zone need to be working in order to check function of ventilator.
- ☑ Check the system for leaks.
- ☑ Set the sensor to 0% RH.
- ☑ Repeat the steps above for all zones (rooms).
- ☑ When all zones are tested, adjust the setpoint on the required RH value. The system is now running.



Calibration of HMH sensor

HMH sensors must be calibrated once a year to get optimal accuracy. Special approved reference tool must be used. Contact Airtec®.

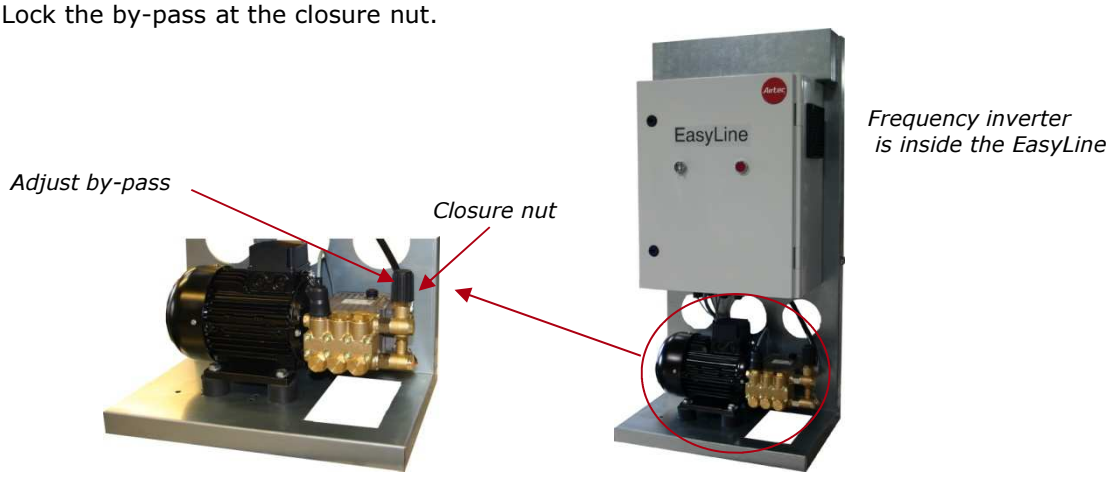
After installation, service or repair of the humidification system unusual running conditions may be observed due to air in the system, this can show as small drips from the nozzles when you start and stop the system. Under normal conditions this will end within 2 - 4 days of running.

Your Airtec® humidification system must always be connected to the power supply and running. This because of considerations. If there are any periods where you do not require humidification, the system must not be shut down, instead you must set the system to 0 % RH.

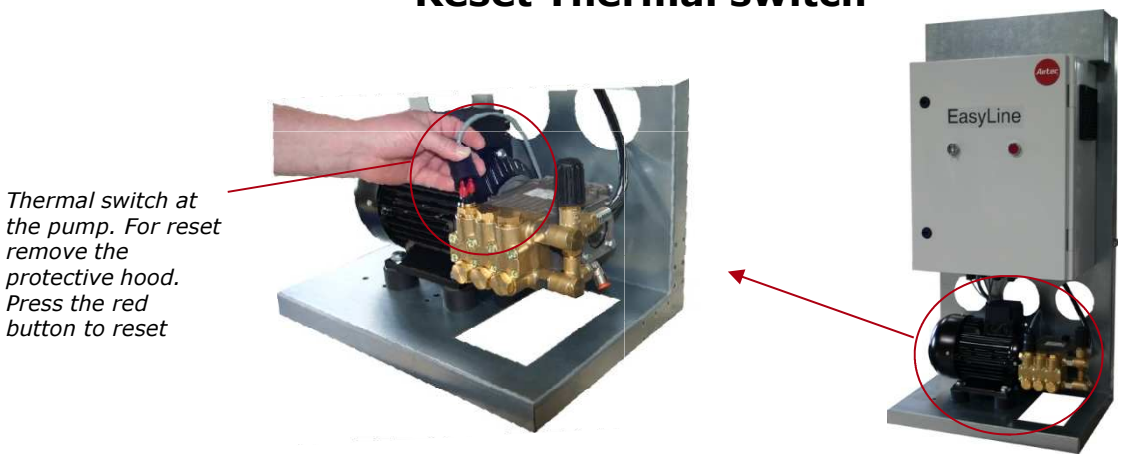
By-pass/overpressure adjustment

To secure the system against overpressure when running, by-pass is adjusted to open at 65 bar. This will avoid short overpressure at the system. Follow the instructions below.

- ☑ Adjust bypass valve so that ”working pressure” is max. 40 bar. Read timer at the frequency inverter.
- ☑ The pump will now run at full speed.
- ☑ Set the set point at pressure to 70 bar at frequency inverter. (See instruction page 14).
- ☑ Adjust bypass valve so that ”working pressure” is 65 bar.
- ☑ Set the set point at pressure to 50 bar at frequency inverter (See instruction page 14).
- ☑ Working pressure will now drop to approx. 50 - 55 bar.
- ☑ Lock the by-pass at the closure nut.



Reset Thermal switch



Hygiejnic Rinse system

Hygienic Rinse system is activated at delivery and the system will run for 20 sec. every 6 hours, and thereby the water in the system will be exchanged.

The Hygienic Rinse can be adjusted to suit the specific customer requirements, contact Airtec® A/S.

Adjustment of By-pass

By-pass is adjusted at the frequency inverter.

☑ Press ”ESC” 4 times – until it says ”PX.XX” in the display, press ”Enter”.

☑ It says ”50.00” in the display, with arrow up, arrow down and arrow to the right adjust the value to ”70.00”, press ”Enter”. Read the working pressure (see page 16). Adjust by-pass to 65 bar (see page 13), the inverter will now run full speed.

☑ Adjust value to ”50.00”, press ”Enter”. The inverter will regulate.

☑ Press ”ESC” 4 times until it says ”PX.XX” in the display, to return to front page.

Reading Timer for running hours

Read timer for running hours at the frequency inverter.

☑ Press arrow down until is says ”MON” in display, press ”Enter”.

☑ Press the arrow until is says ”U4-01” in the display, press ”Enter” 2 times, read the hours.

☑ Press ”ESC” 4 times until it says ”PX.XX” in the display, to return to front page .

Reading Timer for Working pressure

Reading Timer for working pressure at the frequency inverter. The system shall be operating.

☑ Press ”ESC” 4 times

☑ Press arrow down until it says ”MON” in the display, press ”Enter”.

☑ Press the arrow until is says ”U1-13” in the display, press ”Enter” 2 times, read the working pressure.

☑ Press ”ESC” 4 times until it says ”PX.XX” in the display, to return to front page.

Flowcontrol adjustment

Adjust Flowcontrol at the frequency inverter. All zones shall be running.

☑ Press ”ESC” 4 times . Read the value.

☑ Press arrow down until it says ”PAR” in the display, press ”Enter”.

☑ Press the arrow until it says ”Q1-01” in the display, press ”Enter” 2 times, adjust the value approx. 5 over reading value, (see the top of this page), press ”Enter”.

☑ Press ”ESC” 4 times until it says ”PX.XX” in the display, to return to front page.

Programming DigiSens 1000 Sensor

Normal Process data display

Data from integrated humidity and temp. sensor

Display when ON/OFF pressed toggles between Normal and this

Data from integrated Real Time Clock and external temp. sensor

Alarm indicator

Alarm signalling Low hum. or dew - High hum or dew

Press SET to reset or come again on repeated time intervals as set

Communication Failure

Serious error on communication between Paned and Main Controller

Check wires!

Hold SET key for 5 seconds to get to all settings

1 Change values with arrows up and down keys.
2 Proceed to next level with SET key.
3 Will circle all menus when SET is pressed.
4 Menus displayed depends on DIP switch setting in panel, RH or DEW.
5 ON/OFF key will toggle between normal process display and special display, at any time.
6 If in settings, ON/OFF key will always return to normal process display.

Humidity Settings

Temp. Settings

General Advanced Settings
Hold SET key for 10 seconds

Deactivate Sensor

Hold ON/OFF key for 3 seconds.
Sensor is now deactivated.

Activate Sensor

Hold ON/OFF key for 3 seconds.
Sensor is now activated.

Soaking Function

Hold Arrow up key for 3 seconds.
Display shows "Soaking ON".

Deactivate by holding Arrow down key for 3 seconds.
Display shows "Soaking OFF".

Maintenance/Service, EasyLine

Airtec® EasyLine is made of components that in general require very little maintenance. The following texture will explain the required maintenance, of the EasyLine system, to maintain long term reliability of the system.

At any defect in the system; look at the Troubleshooting schedule page 25 or contact Airtec®.

Weekly

EasyLine:

☑ Check that the ventilator in the EasyLine is running and that the filters for this ventilator are clean.

Pump:

☑ Check that, water supply pressure is min 2 bar up to max. 4 bar when system is running.

☑ Check that the working pressure is 50-55 bar. (See display at frequency inverter)
If the working pressure is not 50 – 55 bar the bypass must be adjusted. (See page 13).

☑ Check the oil level on pump, the oil level must max. reach the maximum mark at the oil stick.
If oil is filled below this level it can cause waste of oil.

☑ Check that, colour of oil is light brown, and no foam is created (stop pump for 1 minute before checking. To stop pump set each zone, one of the time, at 0% RH).

☑ Check for oil or water leaks. Be aware that the connection between motor and pump has from factory been oiled and that can cause small droplets of oil below the pump. There can also obtain small water droplets below the pump because of condensation. Clean below the pump when needed.

Monthly

☑ Switch off water supply. System must go into alarm within 60 seconds, and alarm light is flashing.
This function will protect the pump e.g. in case of leak of water and or no water-pressure.

Half-yearly/Yearly

☑ Depending on the supplied water quality and the amount of use of the system, the service interval for a professional service will vary. To obtain the optimal function of the system, Airtec® recommend that at normal operation a professional service is done twice a year.

☑ Check the hygrostats with a calibrated humidity sensor. Contact Airtec®.

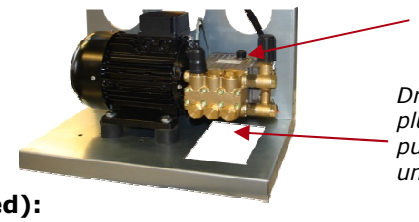
☑ Oil in the pump must be changed min. once a year or every 2000 hours.
The oil level must max. reach the maximum mark at the oil stick.
Oil type: GEARTEX EP-C SAE 80 W-90.

Generally

☑ Water filter from water supply must be changed when needed, depending on water quality.

☑ Oil change at the pump: First oil change is due after 300 hours, then for every 2000 hours yet min. once per year. If there appear condensed water in the oil it must be changed. The oil must be refilled to the maximum mark at the oil stick. Oil type: GEARTEX EP-C SAE 80 W-90.

☑ Seals in the water part of the pump must be changed when needed.



Here you fill up the oil

Drawing off oil; drain plug for draining of pump, the drain plug is underneath the pump

Water Softening system (if installed):

☑ At weekly intervals a test must be taken of the water to check if the system still delivers softened water, use the Airtec® test-kit delivered. Use the test-valve at the water softening system. If the system is used as preparation to a Reverse Osmosis system, it's recommended to make a daily check. (See separate User Manual).

Reverse Osmosis system (if installed):

☑ Check the RO water conductivity/dry solid with supplied measurement device. Water conductivity will vary depending of raw water quality but Airtec® recommend it to be between 10 – 30 µS/cm. If it is under 10 µS/cm it may cause problem for humidification functionality, if it is more than 30µS/cm it can be a sign that the membrane is defect, contact Airtec®. (See separate User Manual).

Measuring instruments and measuring points must be cleaned with alcohol before testing. When testing avoid any skin contact with the water. If any deviations Airtec® must be informed.

Maintenance/Service, Atomisers

At any defect in the system; look at the Troubleshooting schedule page 25 or contact Airtec®.

Weekly

☑ Check that, ventilator is running, and that it's clean and quiet.

☑ Check that the nozzles are atomising correct, as in a cone shape.

Monthly

☑ Clean the atomisers; ventilator and grills.

Scheduled Service Sheet

☐ 1=HACCP Systems
☐ 2=Standard Systems

Order no.:_____

Service:
1/1 year ☐ 1. Time
1/2 year ☐ Installation ☐

Customer:_____

Measured /Calculated				Category	
	Humidification System	Measured	Limit	1	2
1	System pressure (Measured)		50-55 Bar	H	
2	System pressure (Showing)			H	S
3	Difference (1-2)		<=>2 Bar	H	
4	Pressure at the unit *		Min. 40 Bar	H	S
5	Water inlet Alarm		<=0,5 Bar	H	S
6	Pressure water inlet (Measured) (System running)		>=2 Bar	H	
7	Pressure water inlet (Showing) (System running)			H	S
8	Difference (6-7)		<> 0,5 Bar	H	
9	Motor current (Measured)			H	S
10	Motor current (Written on the rating plate)			H	S
11	Motor current (Difference) **		<=105%	H	S
12	Pump temp.		<50ºC	H	S
13	Room temp.		<35ºC	H	S
14	Total hour HP-Pump			H	S
15	Last oilchange, HP-Pump			H	S

* Measure the water pressure at the nozzle furthest away from the pump

** point 9x100 / point 10 = x% Current (with inverter. See in the display on the inverter)

*** point 19x100 / point 20 = x% Current

**** point 36x100 / point 35 = x% Drain

	Softening System	Measured	Limit	1	2
16	Hardness water inlet			H	S
17	Hardness water out			H	S

Measured /Calculated				Category	
	Reverse Osmosis System	Measured	Limit	1	2
18	Water inlet Alarm		<=0,5 Bar	H	S
19	Motor current (Measured)			H	S
20	Motor current (Written on the rating plate)			H	S
21	Motor current (Difference) ***		<=105%	H	S
22	Pressure water inlet (Measured) (System running)		>=2 Bar	H	S
23	System pressure:Basic: ☐ Plus: ☐		>10<16 Bar	H	S
24	Production Membrane 1			H	S
25	Conductivity Membrane 1		<30µ	H	S
26	Production Membrane 2			H	S
27	Conductivity Membrane 2		<30µ	H	S
28	Production Membrane 3			H	S
29	Conductivity Membrane 3		<30µ	H	S
30	Production Membrane 4			H	S
31	Conductivity Membrane 4		<30µ	H	S
32	Production Membrane 5			H	S
33	Conductivity Membrane 5		<30µ	H	S
34	Conductivity in the Tank µ		<30µ	H	S
35	Total Production			H	S
36	Drain amount ****		Min. 25%	H	S
37	Water temp. Water inlet		<20ºC	H	S
38	Water temp. Tank		<20ºC	H	S
39	Conductivity all membranes		<30µ	H	S

1: OK			2: Need to be changed			3: Done/Replaced	
1	2	3	High-pressure	1	2	3	Low-pressure
			Pump (tested)				Nozzles
			Air quality in room				Air filter
			Water filter				Water filter
			Oil in Pump ***				Filter housing
			Governor (tested)				Level tank
			Motor (tested)				Air quality
			Water inlet Valve				Hoses
			Bypass (tested)				
			Run/Relief Valve				
			Connection pump/motor				
			Nozzles				
			Nozzle filter (take out at 1st Service)				
			Unit (tested)				
			Leaks in general				
			Relief (Hoses) **				
			Pump seal ****	1	2	3	RO/Softening System
1	2	3	Control Unit				RO (tested)
			Controller *				Tank inspection
			Alarms (tested)				Tank sensor
			Sensor (tested)				Jp5 pump (tested)
			Pressure transmitter (tested)				Softener (tested)

* At the Service tighten all connections in the controller. At subsequent Services tighten only main electricity.

** The drain hose should not be below the water line in the drain and must remain above it at all times.

*** The oil has to be changed at every 2000 hours. But the first time at 300 hours. The Oil has to be changed min. once a year. If condensed water appear in the oil, the oil has to be changed.

**** The seal in the pump must be changed if needed.

Remark:

Date *Customer sign.* *Date* *Fitter sign.*

Flowdiagram out house – Concerning ISO 22000 HACCP running of Airtec® humidification system

- Log book where all tests, analysis and changes concerning the system are registered.
- In general the customer should follow the supplied user manual.
- Weekly conductivity test at the RO tank.
    - Sample is taken at designated place.
    - Normal conductivity range 10-30 µS/cm, although max. 50.
- Water analysis.
    - Water analysis by start up of system.
    - Water analysis every 6 months.
    - Water sample is taken at the nozzle furthest away in each zone .
    - Bacteria count (Cfu) accordingly to the drinking water standard 200 Cfu/ml.
    - Bacteria count (Cfu) for atomised water for humidification purpose accordingly to VDI 6022 max 1000 Cfu/ml.
    - If the system fails a test another test is done to check.
    - Hereafter authorised Airtec® personnel should be contacted to find the reason and to disinfect the system.
    - When the system has been opened a water test should be performed.
- UV light.
    - Check functionally weekly.
    - Change the light bulb every 12 months or when needed.
- Condensation of water or water on the floor should taken care of momentarily.
- To obtain the optimal function of the system Airtec® recommend that at normal operation a professional service is done twice a year.
- When the system comes to a stand still of a longer lasting period the system should be serviced by authorised Airtec® personnel to disinfect and make the system ready for start up.
- The system should be audited by the customer continuously.
- Deviations from the above mentioned should be reported to Airtec® for review.
- The system should not be serviced/opened without authorised supervision.

- Critical control points.
    - Installation.
    - Running the system.
    - Training.
    - Regular service check of the equipment.
    - Regular water analysis.
    - Regular monitoring of operation.
    - Service interval.
    - Use of User Manual.
    - Inappropriate operation.
    - Current audit and own control.
    - Disinfection procedure.
    - Traceability.
    - Authorised handling.
    - Logbook.

ISO 22000 HACCP system should contain the following:

- Water supply should live up to drinking water standards, but at least equivalent to a Danish drinking water standard.
- Reverse Osmosis water treatment.
- Frequency inverted pump system.
- Hygienic rinse system.
- Hoses sized in a way where you have the least standing water possible.
- System build in a hygienic design using material that ensures minimum level of bacteria growth.
- Service of the system twice a year by authorised Airtec® personnel.
- If customer wish, UV lighting of the water.

Disinfection of Airtec® humidification system

In order to establish the system's bacteriological condition, should a water test be taken. The water sample must be taken at the atomiser/nozzle which is furthest away form the pump station. Measuring instruments and measuring points must be cleaned with alcohol before testing. When testing avoid any skin contact with the water. The water sample must be send to a internationally recognized laboratory to get the analyses wanted.
If 2 consecutive tests show, that the water excess the authorized limit of Cfu figures the system must be disinfected in accordance with Airtec® procedure as described below.

Procedure for disinfection:

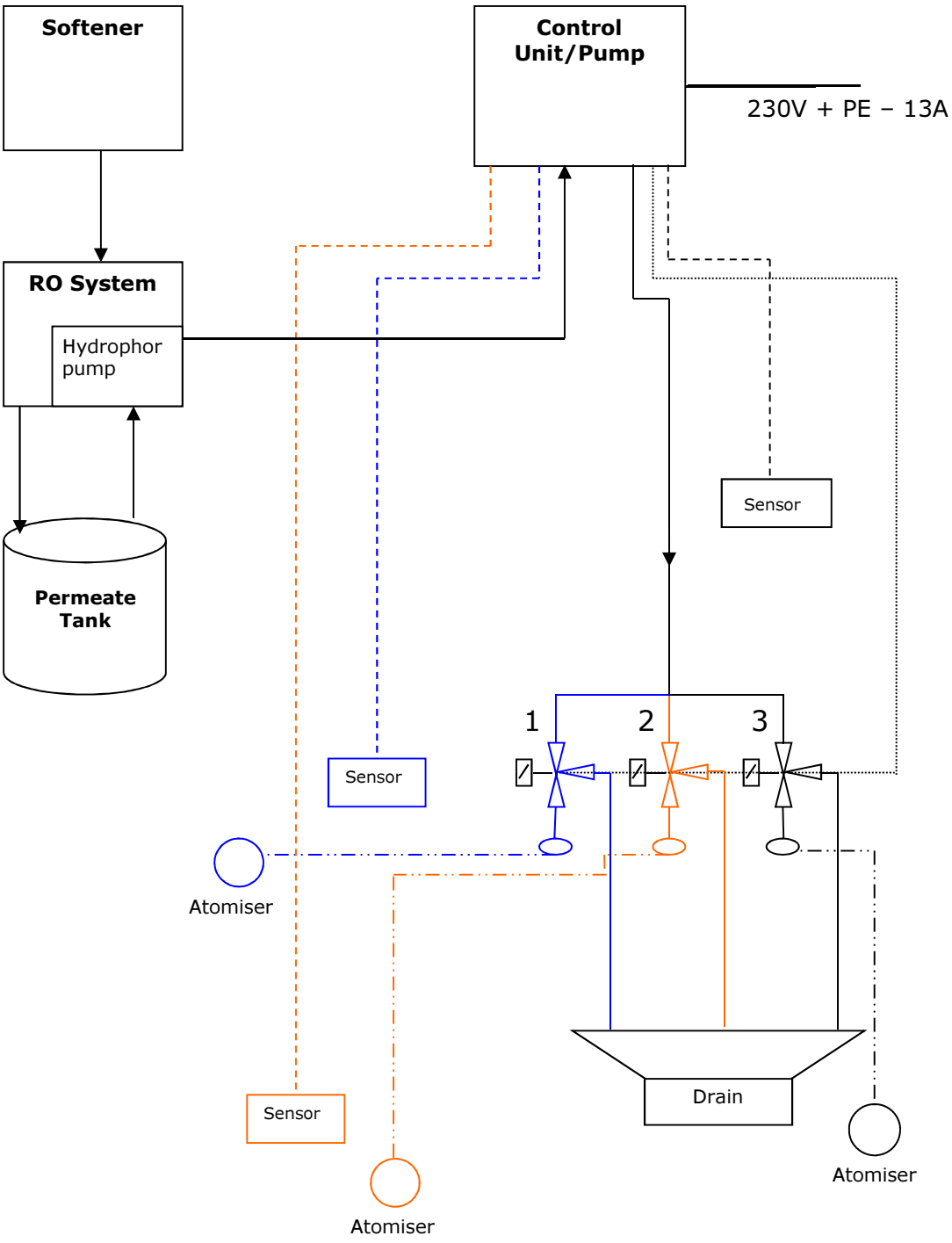
- ☑ Plan the progress in this task.
- ☑ Read and understand this procedure for disinfection and the supplier user manual.
- ☑ Measure the waters pH value of the atomiser/nozzle furthest away from the pump station. The sample is taken by collecting atomised water from a nozzle. Note the test to be able to compare. The same point is then later to be used to take out future water samples.
- ☑ The water inlet to the parts which is wanted disinfected is to be connected to a mixer tank or dosage equipment which will supply the system with 1 to max. 2% disinfection fluid. Afterwards measure the pH value of the fluid and note the value to be able to compare.
- ☑ Where pump station and atomisers/nozzle will be a part of the disinfection, the part of the water which consist of disinfection fluid must be connected to drain, when there are no people in the room. The rooms must be ventilated wither mechanical or by creating a ventilation by opening doors/windows.
  Alternative must all atomisers/nozzles in each zone be bleed with hoses directly at the nozzle and collected in containers. The collected water can be led to drain.
- ☑ Switch on the humidification system, and in the zone (zones) which are activated measure the pH value of the water to ensure that the disinfection fluid is completely distributed to the whole system. Meaning that the pH value is the same as measured at mixing the fluid. Afterwards switch off the humidification system.
- ☑ The fluid is to be contained in the system for 30 min. to max. 1 hour, after which the system must be rinsed with clean water. Then measure the pH value to ensure that the value is the same as before the disinfection started.
  Then it is ensured that the system is empty for disinfection fluid.

The disinfection fluid used is approved by the Danish Ministry of Veterinary & Food.

Information and supplier user manual can be supplied by contacting Airtec® A/S.

Installation

System Overview



Troubleshooting

Error/Error message:	Cause:	Solution:
Pump does not start.	Relay is switch off. Motor or pump are blocked. External stop is activated. No zones need humidity.	Check fuses and power supply. Check the external unit.
No light in On/off button.	No power supply. Light bulb is defect. System is off.	Check fuses and power supply. Replace light bulb.
Pump is running but is not bringing water into the zones (rooms).	Defect Solenoid valve.	Replace Solenoid valve.
Nozzle is dripping when system is running.	Nozzle is blocked.	Replace nozzle.
Alarm light is on. (After repairing or reset of errors, always press the Alarm Reset button).	**Missing water pressure.** Water pressure is too low. Filter is blocked.	 Check the water supply. Check the water filter.
	Error on Frequency inverter. Motor or pump are blocked. Pressure is too high. Normally (50-55 bar).	 Call Airtec®. Adjust Bypass to 50-55 bar. Call Airtec® personnel.
	Temp. on pump is too high. Filter in ventilator at EasyLine is blocked. Defect Solenoid valve. Defect pump.	 Reset the Thermal switch at the pump. See picture at page 13. Replace filter in Ventilator. Replace Solenoid valve. Replace pump.
	Water leak. Break on hose. Or other leak.	 Replace hose. Call Airtec® personnel.
System does not run.	Power cut.	Press the Reset/Start button.

Spare parts

Description	Part no.
Frequency inverter	231230
Sensor DigiSens 1000	121200
Sensor HMH	121300
Control Unit ventilator	221310
Filter for Control Unit ventilator	231250
Pressure button, red	231820
LED element, red	231830
Turning button	231825
LED element, green	231835
Contact bloc NO	231840
Automatic fuses 2A 1 Pol	231310
Automatic fuses 13A 1 Pol	231320
El-Motor	231740
Non-return valve, 1/8”	161710
Pressure transmitter 0-100 bar	231122
Control relay 24 V AC	231140
Thermal switch	231210
By-pass	201410
Pump A-600	201310
Solenoid valve, complete	211110
Water filter 10”, 60%	191010
Ventilator for HydroJet atomiser	221120
Ventilator for HydroTrio atomiser	221210
Ventilator for HydroOne atomiser	221310
Nozzle, complete 5,3 l/h, no. KBN	182340
Nozzle stainless steel, complete 4 l/h, no. 2	182320
Nozzle stainless steel, complete 2,7 l/h, no. 1	182310
Sealing kit for Pump A-600	201430
Low Flow Kit kontin. 21 l/h	111315
Salt for softening system, 25 kg. per back	176225

Spare parts Recommended

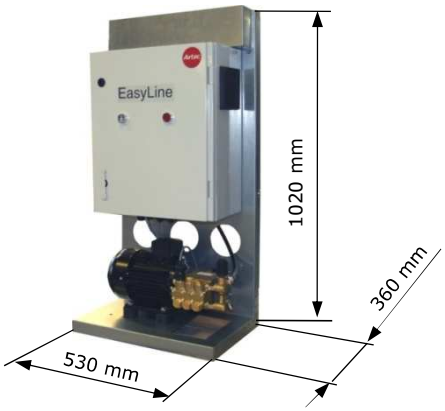
Description	Part no.
Solenoid valve, complete	211110
Water filter 10”, 60%	191010
Oil for Pump A-600	201450
Nozzle, complete 5,3 l/h, no. KBN	182340
Nozzle stainless steel, complete 4 l/h, no. 2	182320
Nozzle stainless steel, complete 2,7 l/h, no. 1	182310
Sealing kit for Pump A-600	201430
Salt for softening system, 25 kg. per back	176225

Datasheet EasyLine

Datasheet EasyLine incl. DigiSens sensor

This datasheet contains the overview for EasyLine and shows the opportunity for facilities.

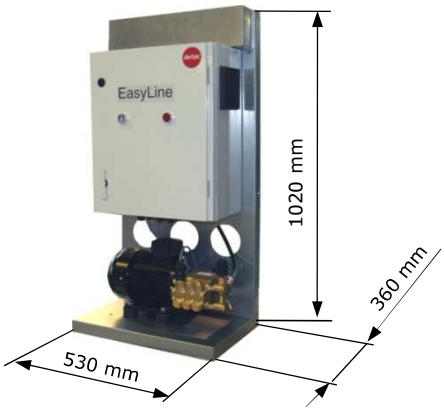
EasyLine standard incl. DigiSens sensor	
Humidity Control (number of zones)	3
Temperature Control (number of zones)	3
Temperature Control, pump	Yes
Variable On/Off time	Yes
Hygienic Rinse-system, replacement of water	Yes
Timer for running hours	Yes
Potential free inlet	Yes
Alarm indicator at the control unit	Yes
Flow guard	Yes
Water pressure alarm	Yes
High/Low humidity alarm	Yes
Ventilator start/stop	Option
Measures	h1020, w530, d360 mm
Weight	50 kg
Surrounding temp.	1 – 35 ºC
Frequency inverter	1,1 kW
El-motor	1,10kW/1000 rpm
Supply	230 V +PE – 13 A
Noise level	< 70 dB(A)
Capacity	12 – 600 l/h



Datasheet EasyLine incl. HMH sensor

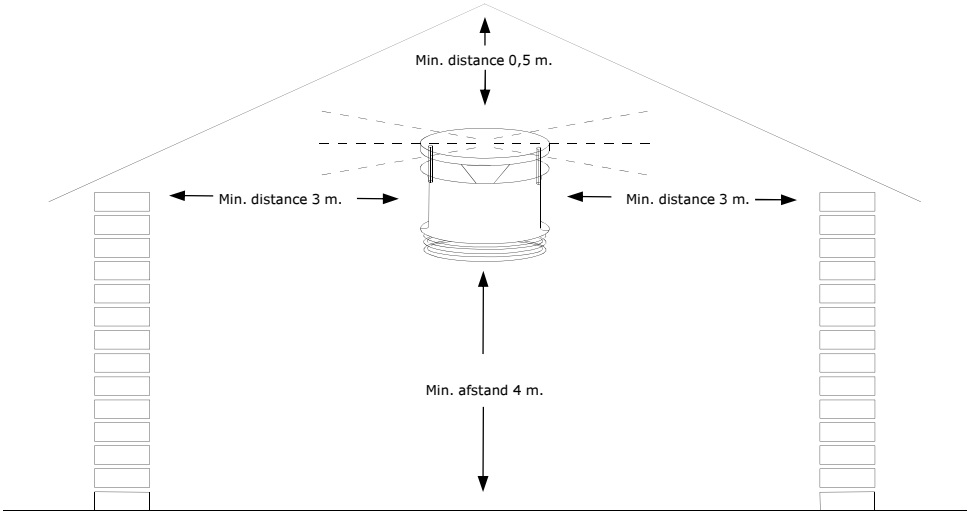
This datasheet contains the overview for EasyLine and shows the opportunity for facilities.

EasyLine standard incl. HMH sensor	
Humidity Control (number of zones)	3
Temperature Control (number of zones)	No
Temperature Control, pump	Yes
Variable On/Off time	No
Hygienic Rinse-system, replacement of water	Yes
Timer for running hours	Yes
Potential free inlet	Yes
Alarm indicator at the control unit	Yes
Flow guard	Yes
Water pressure alarm	Yes
High/Low humidity alarm	No
Ventilator start/stop	Option
Measures	h1020, w530, d360 mm
Weight	50 kg
Surrounding temp.	1 – 35 ºC
Frequency inverter	1,1 kW
El-motor	1,10kW/1000 rpm
Supply	230 V +PE – 13 A
Noise level	< 70 dB(A)
Capacity	12 – 600 l/h

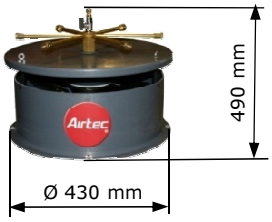


Datasheet HydroJet atomiser

HydroJet atomiser	
Ventilator type	Axial ventilator
Capacity	24 l/h. (6x2,7/4,0/5,3 l/h)
Working pressure	50-55 bar
Supply	230 V AC
Blower capacity	1850 m³/h
Rpm	940 rpm
Max. input	80 Watt
Max. current	0,39 A
Usage	Rooms with min. 4 m. ceiling
Surroundings	40°C, 60% RH
Noise level	< 70 dB(A)
Measures	Diam. 430, H 490 mm
Weight	7 kg
Nozzles per atomiser	6 off

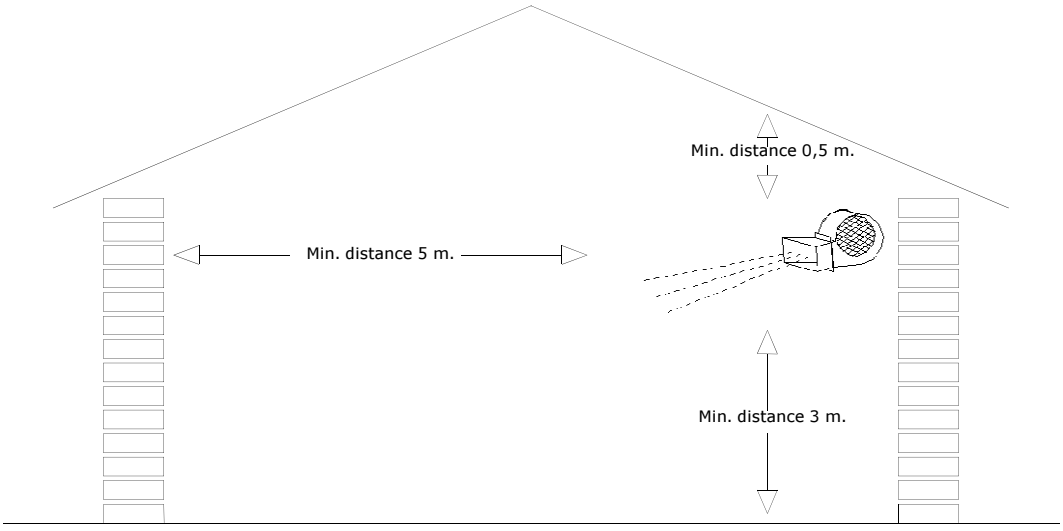


HydroJet

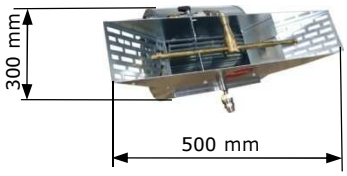


Datasheet HydroTrio atomiser

HydroTrio atomiser	
Ventilator type	Centrifugal ventilator
Capacity	12 l/h (3x2,7/4,0/5,3 l/h)
Working pressure	50-55 bar
Supply	230 V AC
Blower capacity	645 m³/h
Rpm	1000 rpm
Max. input	65 Watt
Max. current	0,29 A
Usage	Rooms with low ceiling and/or limited space
Surroundings	40°C, 60% RH
Noise level	< 70 dB(A)
Measures	H: 300, W: 500, D: 240 mm
Weight	5 kg
Nozzles per atomiser	3 off

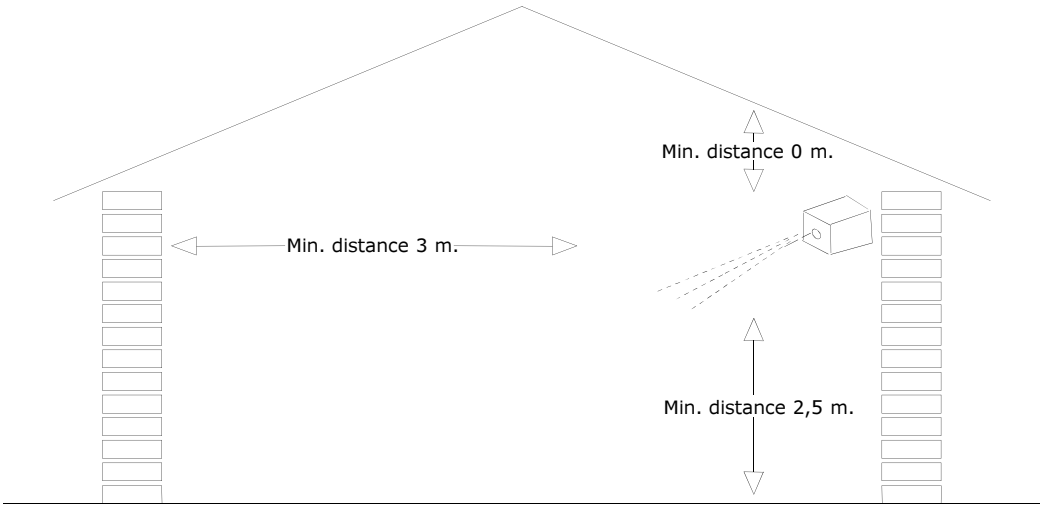


HydroTrio

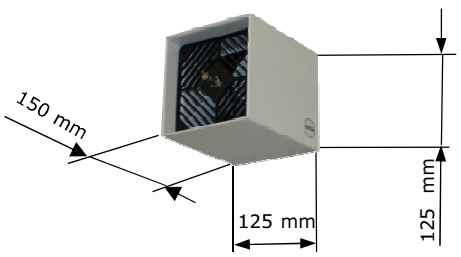


Datasheet HydroOne atomiser

HydroOne atomiser	
Ventilator type	Axial ventilator
Capacity	4 l/h (2,7/4,0/5,3 l/h)
Working pressure	50-55 bar
Supply	230 V AC
Blower capacity	164 m³/h
Rpm	2850 rpm
Max. input	22 Watt
Max. current	0,14 A
Usage	Rooms with low ceiling and/or limited space
Surroundings	40°C, 60% RH
Noise level	40,5 dB(A)
Measures	H: 125, W: 125, L: 150 mm
Weight	2 kg
Nozzles per atomiser	1 off



HydroOne



Datasheet SlipLock with nozzle

The unique SlipLock system is specially designed by Airtec® for supplying water under high pressure. The system contains of SlipLock fittings and polyamide hoses that with simple means, is fitted without special tools or extensive experience.

The SlipLock system is supplied as an assembly kit. All components have o-ring seals, this eliminates the need for special tools and guarantees it seals every time.

The kit is supplied with a special nozzle that ensure a very good atomisation at 50 bars pressure. The nozzle is shielded with ceramics inside ensuring a prolonged lifetime compared with traditional nozzles.

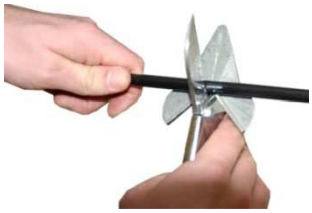
With a simple blind cork the system can be assembled as an elbow and used for the installation of the hoses as well.

The kit is assembled and tightened with a wrench.

- And is now ready for use.

The high pressure hose is cut with a sharp scissor.

- And the SlipLock fitting is clicked on.



The nozzle is now installed and ready for use.
Please notice that the nozzle can be adjusted and is able to rotate 360 degrees - even after being installed.

The nozzle should be installed where there is some circulation of air to ensure the best evaporation possible.

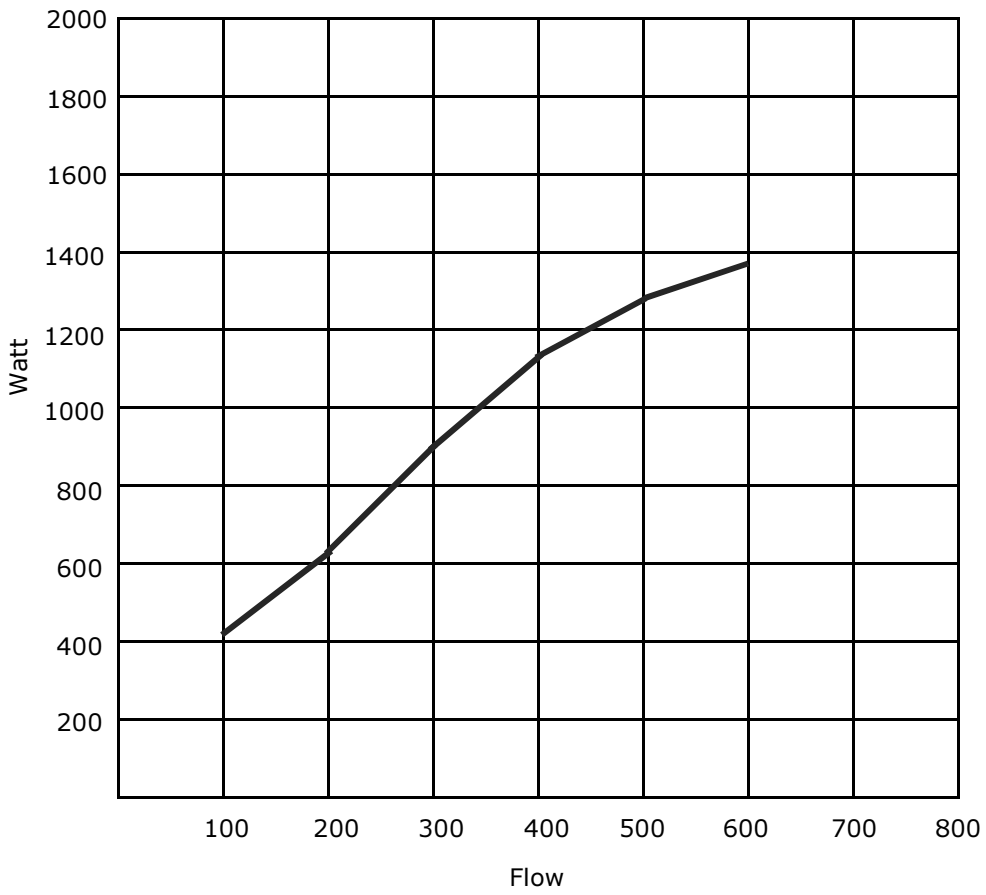
- Fittings are produced in brass, sealed with a nickel plated surface to ensure optimised corrosion resistance.
- The hoses is produced in Polyamide 12 (PA 12-HL) Black in colour, stabilised heat ageing as well as being light stabilised.

Datasheet for Watts consumption – Electric Motor

Measurement of watt consumption of 1.1 kW electric motor

Flow	Watt
100	407
200	622
300	871
400	1140
500	1250
600	1375

Flow Diagram for Watts consumption by 1.1 kW electric motor



Datasheet high-pressure hose

Dimensions and Pressures

Part number	Tube OD + wall thickness (mm)	Max. working pressure at +23 ºC (Bar/psi)	Min. bend radius (mm)
NR4X1/5	4x1	88/1285	20
NR10X2/5	10x2	66/965	60

Airtec® high-pressure hoses are designed for a max. pressure of 3 times the given working pressure at +23ºC.

Mechanical Material Properties

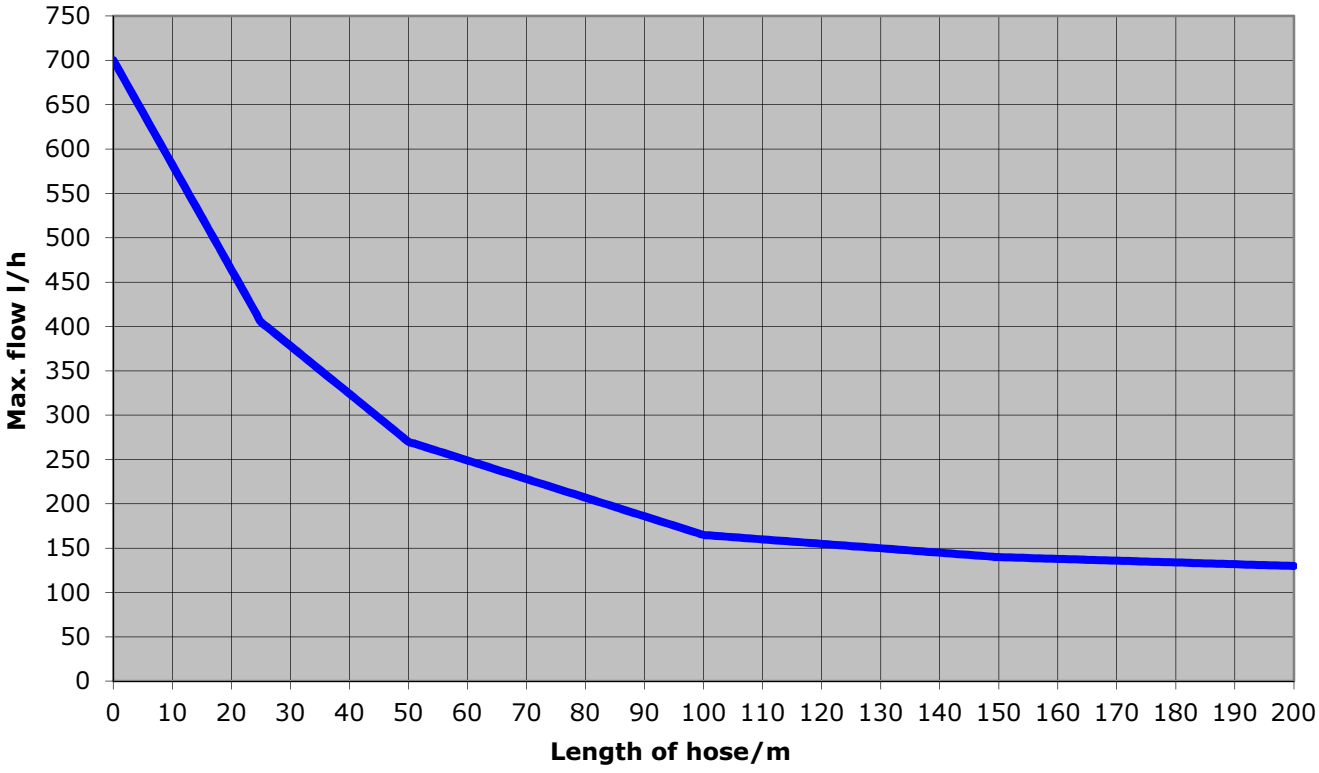
Material:
Polyamide 12 (PA 12-HL) black colour, heat ageing stabilised, light stabilised.

Temperature Effect On Working Pressure

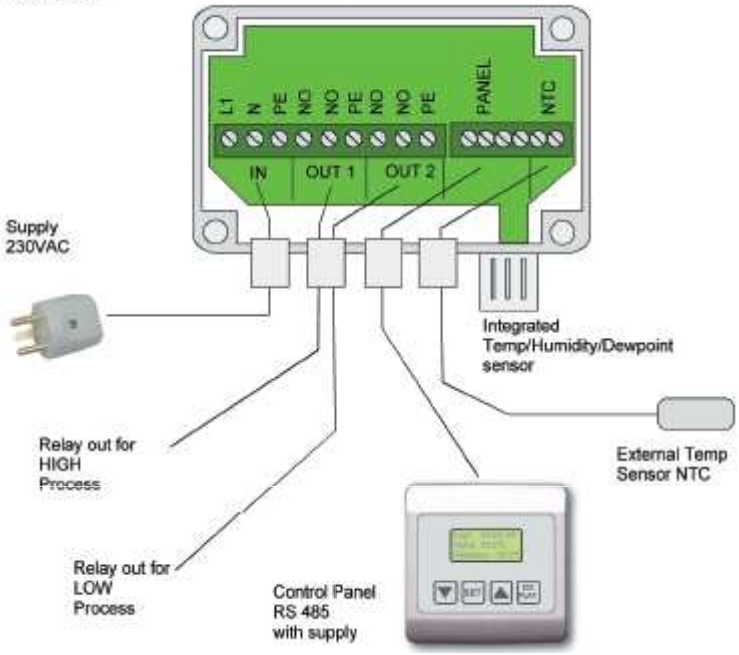
Temperature	Temperature effect on working pressure Nylon
20 ºC	100.0%
30 ºC	90.0%
40 ºC	80.0%
50 ºC	70.0%
60 ºC	60.0% *(Not recommendable)*

As the working temperature of a hose increases, the working pressure will reduce. The table gives guidance on how the working pressures reduce. The table is only a guide.

Flow Diagram for 10 mm High-pressure Hose



Connection



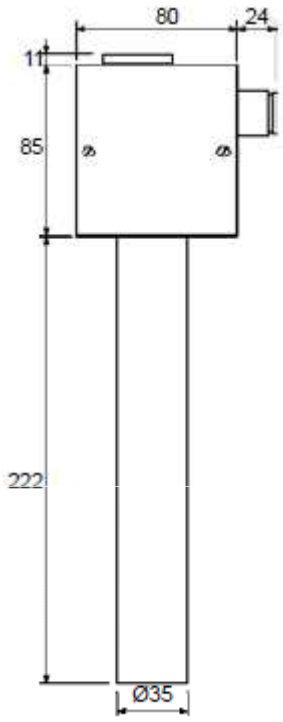
Technical data

- 207-253 VAC / 50Hz supply.
- 2 Relay output 2A / 230VAC.
- 1 NTC input -30-+70ºC/0.1ºC.
- Integrated Temp. sensor -40-+60ºC/0.1ºC.
- Integrated Hum. sensor 5-95%RH/0.1%RH.
- Integrated dewpoint sensor -40-+60ºC.
- Real time clock with Lit. Bat. Backup.
- Surrounding temperature -5 – 45ºC.
- Air-humidity 5-95% RH.
- Control from RS485 OPUS 75 panel.
- RS485 supply to panel.
- Max. 500 meter pair twisted cable to panel.
- Un-necessary with protected cable.
- Density level IP 54 for Main Controller.
- PG sockets / No connection to screw terminal at print.
- CE approved (EMC 89/336/EEC, LVD 73/23/EEC).
- Measure 130x80x60 mm for Main Controller.
- Measure 75x75x30 mm for Panel OPUS 75.

Humidity output :

- Range :0-100% RF
- Resolution : 0.1% RF
- Accuracy : +/- 3,5% in 20-80% RF
- Accuracy : +/- 5,0% in 0-100% RF
- Repeatability : +/- 0.1% RF
- Response time : 10 sec
- Nonlinearity : < 1% RF
- Hysteresis : +/- 1% RF
- Long term stability : < 1% RF/year

Datasheet HMH sensor



Technical data

- 2 Relay output 10A / 250VAC.
- Setting Setpoint 10-100 % RH.
- Hysteresis 3% RH – 45% RH.
- Ambient temperature sensor -20 – 70ºC.
- Ambient temperature housing -20 – 60ºC.
- Density level IP 54.
- PG11 sockets.
- CE approved (European LVD standards IEC669-1 + IEC669-2-1).
- Measures 318x104x70 mm.
- Weight 0,6 kg.

Certification

Airtec® A/S is ISO 9001/14001 and ISO 22000 accredited by Det Norske Veritas Danmark A/S.

ISO 9001: Airtec® A/S has committed itself to live up to a number of standards of quality, which guarantees the customer quality.

ISO 14001: Environmental system gives the customer an assurance that a product is produced within environmentally correct conditions.

ISO 22000: HACCP certification gives the customer a guarantee that the products are produced according to the international approved HACCP principals as regards hygienic security.

Environment, Quality and Hygiene Standards

Airtec® A/S´ quality standards are dependable, environmentally aware, and are a hygiene conscious company. We develop, produce and market water based humidification systems which will live up to the customers demands for operation, environment, hygiene and delivery, where disruption to the customer will be kept to a minimum.
The reason for the Airtec® standards for hygiene is to document that we, at Airtec®, can control the physical, chemical and bacteriologic aspects around our humidification systems.

Setting the Standard

Based on our environment, quality and hygiene standards, Airtec® wish to set the highest safety levels possible using and producing our systems.
Treating our customers and products to the highest possible level will give us pride and satisfaction in setting the standard for the industry.

NOTICE: To live up to the HACCP standards there are some restrictive demands that must be fulfilled. To consider these as fulfilled, you must reach a HACCP agreement with Airtec®. This will emerges clearly from Your Order confirmation.

As supplier of the humidification system, Airtec® is responsible for procedures concerning production, installation and start-up. The user is responsible for operating in accordance with their "Own Control Procedure", this will ensure that your system always operates safely and efficiently.

General Conditions
for
Airtec® Danmark A/S

The following General Conditions shall be valid for all sales made by Airtec® Danmark A/S, Hvedemarken 21, DK-7620 Lemvig, Denmark (the seller) unless otherwise specifically agreed and stated in the order confirmation or in any agreement between the parties.
In case of any discrepancy between these General Conditions and the buyer's general conditions, the following conditions shall be valid:

§ 1 Orders
Any offer, quotation etc. is given subject to final order confirmation. No order is accepted before written order confirmation has been sent to the buyer. No change or cancelling of an order is accepted without written confirmation of the seller.

§ 2 Agreement
For all orders and deliveries it will be according to Orgalime S 2000 or if installation is incl. in the delivery - Orgalime SE 01 - in the condition these are not different in the following or through other written agreement between the parties.
Buyers shall draw attention to that Orgalime S 2000 and Orgalime SE 01 among other things includes rules about delivery time, delay, ground for relief, responsibility of lack, product liability and force majeure. Orgalime s 2000 - Orgalime SE 01 can be ordered by contacting Airtec® Danmark A/S or can be downloaded at www.airtecsolutions.com.

§ 3 Terms of delivery
The term of delivery is ex works according to Orgalime S 2000 and Orgalime SE 01 to the address of the buyer as stated in the order confirmation and based on the cheapest way of transportation. In case of any reasonable doubt concerning the buyer's ability to pay, the seller is allowed to demand security or prepayment and shall be allowed to retain or stop the goods until the security has been established or prepayment made. The time of delivery is to be counted from the date of the order confirmation unless otherwise indicated herein. The buyer is obliged to take care that the conditions at the place for delivery (e.a. access to the area, water, electricity and outflow) make it possible to execute the necessary work and delivery. Otherwise the buyer is committed to bear all extra costs, including transport costs, in consequence hereof.

§ 4 Terms of payment
The terms of payment are – unless otherwise agreed:
14 days net from the date of the invoice against agreed security or
COD (cash or delivery) less 2% discount
For machinery and plants: as agreed in the order confirmation

In case of delayed payment interest will be charged with 2% per commenced month. The prices are fixed according to the prices indicated in the order confirmation. However, until the delivery has taken place the prices can be regulated due to circumstances beyond the control of the seller, such as changes in currency exchange rates, taxes, duties etc.
All prices and payments are in Euro (€) unless otherwise stated in the order confirmation. The prices do not include V.A.T.
Payment shall be made directly to the seller in Denmark. The buyer is not allowed to hold back any part of payments due to the seller with reference to circumstances, objections etc. that are not recognized by the seller.

§ 5 Conformity of the goods
Not later than 8 days after receipt of the goods the buyer must give written notice to the seller of any lack of conformity. Our products are including a 24 Months guarantee, valid from the day of the invoice, against material and defects of the production referring to Orgalime S 2000 and Orgalime SE 01.
In case of justified lack of conformity the seller shall at his own choice be allowed to replace the goods or to remedy the lack of conformity by repair. Any repair must be carried out by the seller unless otherwise agreed. Possible transportable costs including driving time and mileage in connection with the remedy of lack of conformity must be paid by the buyer. Further claims can not be raised against the seller. The seller is only responsible for damages caused by the sold goods; if it is proved that the damage is due to a fault by the seller or his employees. The seller is never liable for loss of profits or other indirect losses. The seller's liability for damaged goods can only meet the agreed price of the goods. The right to repair or replace does not apply, if the goods have been used for other purposes then intended or the goods have been treated in a wrong way, or if the goods have been changed without the consent of the seller.
The right to repair or replace implies that the buyer gives written notice immediately upon ascertaining the lack of conformity.
The seller takes reserve for that the instructions in the delivered User guide are followed and that only parts approved by the seller are used. If there has been performed an operation without agreement with the seller the guarantee will renounce.

§ 6 Insurance
It is the buyers responsibility to keep machinery and plants, which Airtec® Danmark A/S shall install insured while these are to be found at the buyers ground, against fire, theft, water damage and vandalism, for an amount minimum equivalent to the agreed purchase price.

§ 7 Reservation of title
The products shall remain the property of the seller until paid for in full to extent that such retention of property is valid under the applicable law. The buyer shall at the request of the seller assist him in taking any measures necessary to protect the seller's title to the products in the territory. The retention of title shall not affect the passing of risk.

§ 8 Product liability
The seller's liability for personal injury according to rules in existing law, yet so that the seller is never liable for loss of profits or other indirect losses.

§ 9 Ground for relief
Force Majeure
The following circumstances shall be considered as grounds for relief if they impede the performance of the contract or makes performance unreasonable onerous:
Industrial disputes and any other circumstances beyond the control of the parties such as fire, war, mobilization or military call up of a comparable scope, requisition, seizure, currency restrictions, insurrection and civil commotion, shortage of transport, general shortage of materials, restrictions in the use of power and defects of delays in deliveries by sub suppliers.
The above described circumstances shall constitute grounds for relief only if their effect on the performance of the agreement could not be foreseen at the time of the formation of the agreement.

§ 10 Industrial rights
All industrial rights to the products, trademarks, symbols, patterns, designs etc. remain at any time the property of the seller.

§ 11 Law applicable
Any order, contract or agreement between the parties shall be governed by the laws of Denmark.

§12 Dispute settlement
Any dispute or claim arising out of or in connection with the trade between the parties shall be settled by arbitration in accordance with "the Rules of Procedure of Danish Institute of Arbitration (Copenhagen Arbitration)". The place of arbitration shall be Lemvig, Denmark.

§13 Modifications and amendments
All modifications and amendments to these General Conditions must be made in writing.

September 2008

Log Book

When checking the system this schedule must be fulfilled, for use to the following service check.

Date	Hours	Water quality	Oil changed	Waterfilter changed	Supply pressure	Working pressure	Salt refill	Sign.

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Remember!
Make a copy of this page, before filling in the journal.